South Carolina Department of Transportation

A POLICY FOR ACCOMMODATING UTILITIES ON HIGHWAY RIGHTS-OF-WAY

August 2005

Chapter 1 - **Application**

1.1. Introduction

1.1.1 This Manual is established to regulate the location, installation and adjustment of utility facilities on the State Highway System, and also the issuance of permits for such work, in the interest of safety and of protection, utilization, and future development of the State of South Carolina roads and bridges.

1.2. Definition of Terms

Arterial highway - A general term denoting a highway primarily for through traffic, usually on a continuous route.

Average daily traffic - The average 24-hour volume, being the total volume during a sated period divided by the number of days in that period. Unless otherwise stated, the period is a year. The term is commonly abbreviated as ADT.

Backfill - Replacement of suitable soil or material around and over a pipe.

Bedding – Organization of suitable soil or material to support a pipe.

Bury – Depth of top of pipe below grade of roadway or ditch.

Cap – Rigid structural element surmounting a pipe.

Carrier – Pipe directly enclosing a transmitted fluid (liquid or gas).

Casing – A larger pipe enclosing a carrier.

Clear roadside policy – The policy employed by a highway authority to increase safety, improve traffic operation, and enhance the appearance of highways by designing, constructing, and maintaining highway roadsides as wide, flat and rounded as practical and as free as practical from physical obstructions above the ground such as trees, drainage structures, massive sign supports, utility poles, and other ground mounted obstructions.

Clear zone – The total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a clear run-out area. The desired width is dependant upon the traffic volumes and speeds and on the roadside geometry.

Coating – Material applies to or wrapped around a pipe.

Conventional highway – A highway without access control.

Conduit or Duct – An enclosed tubular runway for protecting wires or cables.

Control of access – The condition where the right of owners or occupants of abutting land or other persons to access, light, air, or view in connection with a highway is fully or partially controlled by public authority.

Full control of access – Means that the authority to control access is exercised to give preference to through traffic by providing access connections with selected pubic roads only by prohibiting crossings at grade or direct private driveway connections.

Partial control of access – Means that the authority to control access is exercised to give preference to through traffic to a degree that, in addition to access connections with selected public roads, there may be some crossings at grade and some private driveway connections.

Cradle – rigid structural element below and supporting a pipe.

Department – South Carolina Department of Transportation

Direct burial – Installing a utility underground without encasement, by plowing.

Drain – Appurtenance to discharge liquid contaminants from casings.

Encasement – Structural element surrounding a pipe.

Encroachment - Unauthorized use of highway rights-of-way or easement as for signs, fences, buildings, etc.

Expressway – A divided arterial highway for through traffic with full or partial control of access and generally with grade separations at major intersections.

Flexible pipe – A plastic, fiberglass, or metallic pipe having large ratio of diameter to wall thickness which can be deformed without undue stress.

Freeway – An expressway with full control of access.

Frontage road – A local street or road auxiliary to and located on the side of an arterial highway for service to abutting property and adjacent areas and for control of access.

Gallery – An underpass for two or more pipelines.

Grounded – Electrically connected to earth or to some extended conducting body which serves instead of the earth whether the connection is intentional or accidental.

Grout – A cement mortar consisting of a slurry of fine sand or clay, as conditions govern.

Highway, Street or Road – A general term denoting a public way for purposes of vehicular travel, including the entire area within the rights-of-way.

Jacket – Encasement by concrete poured around a pipe.

Major highway – An arterial highway with intersections at grade and direct access to abutting property, and on which geometric design and traffic control measures are used to expedite the safe movement of through traffic.

Manhole – An opening in an underground system which workmen or others may enter for the purpose of making installations, inspections, repairs, connections and tests.

Median – The portion of a divided highway separating the traveled ways for traffic in opposite directions.

MUTCD – Manual on Uniform Traffic Control Devices, latest edition.

Non-toneable material – Materials that do not transfer along its length traceable signals by means of electromagnetic, magnetic, or elastic wave detection methods.

Normal – Crossing at a right angle.

Oblique – Crossing at an acute angle.

Overfill – Backfill above a pipe.

Parkway – An arterial highway for noncommercial traffic, with full or partial control of access, and usually located within a park or a ribbon of park like developments.

Pavement structures – The combination of sub-base, base course, and surface course placed on a sub-grade to support the traffic load and distribute it to the roadbed.

Permittee – An individual, company, or governmental agency authorized to perform work on or occupy the rights-of-way of the Department.

Pipe – A tubular product made as a production item for sale as such. Cylinders formed from plate in the course of the fabrication of auxiliary equipment are not pipe as defined here.

Pressure – A measurement of relative internal pressure in psig (pounds per square inch gauge).

Private Utility – A utility that does not meet the requirements of a "Public Utility" as defined below.

Public Utility – Any organization, corporation, municipality, county, authority or other association providing any type of utility service to the general public, or segments thereof, for compensation and subject to the applicable SC State law.

Rights-of-way – A general term denoting land, property, or interest there in, usually in a strip, acquired for or devoted to transportation purposes.

Rigid pipe – A welded or bolted metallic pipe or reinforced, pre-stressed, pre-tensioned concrete pressure pipe designed for diametric deflection of less than 1.0%.

Roadside – A general term denoting the area adjoining the outer edge of the roadway. Extensive areas between the roadways of a divided highway may also be considered roadside.

Roadway – The portion of a highway, including shoulders, for vehicular use. A divided highway has two or more roadways.

Safety rest area – A roadside area with parking facilities separated from the roadway provided for motorists to stop and rest for short periods. It may include drinking water, toilets, tables and benches, telephones, information, and other facilities for travelers.

Scenic overlook – A roadside area provided for motorist to stop their vehicles beyond the shoulder, primarily for viewing the scenery in safety.

Semi-rigid pipe – A large diameter concrete or metallic pipe designed to tolerate diametric deflection up to 3.0%.

Side fill – Backfill alongside a pipe.

Slab, floating – Slab between but not contacting pipe or pavement.

Sleeve – Short casing through pier or abutment of highway structure.

Traveled way – The portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

Trenched – Installed in a narrow open excavation.

Untrenched – Installed without breaking ground or pavement surface, such as by jacking or boring.

Use and occupancy agreement – The document by which the highway authority regulates and/or gives approval of the use and occupancy of highway rights-of-way by utility facilities or private lines.

Vent – Appurtenance to discharge gaseous contaminants from casings.

Walled – Partially encased by concrete poured alongside the pipe.

Watchman – Person on call to maintain traffic control devices.

Chapter 2 - **Accommodations**

2.1. Location

2.1.1 Utility facilities shall be located to minimize need for later adjustments to accommodate future highway improvements and to permit servicing such lines with minimum interference to highway traffic.

2.1.2 Longitudinal installations shall be located on uniform alignment as near as practicable to the rights-of-way line so as to provide a safe environment for traffic operation and preserve space for future highway improvements or other utility installations. Where irregular shaped portions of the rights-of-way extend beyond the normal rights-of-way limits, variances in the locations from the rights-of-way line shall be allowed as necessary to maintain a reasonable uniform alignment for longitudinal overhead and underground installations.

2.1.3 To the extent feasible and practicable, utility line crossings of the highway shall cross on a line generally perpendicular to the highway alignment.

2.1.4 The horizontal and vertical location of utility lines within the highway rights-of-way limits shall conform to the clear roadside policies applicable for the system, type of highway, and specific conditions for the particular highway section involved. The location of above ground utility facilities shall be consistent with the clear zones as stated in the *AASHTO-Roadside Design Guide* (Latest edition).

2.1.5 In all cases, full consideration shall be given to measures, reflecting sound engineering principles and economic factors, necessary to preserve and protect the integrity and visual quality of the highway, its maintenance efficiency and the safety of highway traffic.

2.1.6 The State Highway Engineer or his designee must review the locations of all pipelines to ensure that the proposed utility installation will not interfere with existing or planned highway facilities or with highway maintenance and operation processes.

2.2. Design

2.2.1 The utility shall be responsible for the design of the utility facility to be installed within the highway rights-of-way or attached to a highway structure. The highway authority shall be responsible for review and approval of the utility's proposal with respect to the location of the utility facilities to be installed and the manner of attachment. This design and approval process shall include the measures to be taken to preserve the safe and free flow of traffic, structural integrity of the roadway or highway structure, ease of highway maintenance, appearance of the highway, and the integrity of the utility facility.

2.2.2 Utility installation on, over or under the rights-of-way of State Highways and utility attachments to highway structures shall, as a minimum, meet the following requirements:

2.2.2.1 Electric power and communication facilities shall conform to the currently applicable National Electric Safety Code.

2.2.2.2 Water lines shall conform to the currently applicable Specifications of the American Water Works Association.

2.2.2.3 Pressure pipelines shall conform with the currently applicable section of The Standard Code for Pressure Piping of the American National Standards Institute; Title 49 CFR, Parts 191, 192 and 195; and applicable industry codes, including current issues of:

Power Piping

Petroleum Refinery Piping

Liquid Petroleum Transportation Piping Systems

Gas Transmission and Distribution Piping Systems

2.2.2.4 Liquid petroleum pipelines shall conform to the currently applicable recommended practice of the American Petroleum Institute for pipeline crossings under railroads and highways.

2.2.2.5 Any pipeline carrying hazardous material shall conform to the rules and regulations of the US Department of Transportation governing the transportation of such materials.

2.2.3 Ground mounted utility facilities shall be of a design compatible with the visual quality of the specific highway section being traversed. See Section 7.2 - “Scenic Enhancement”.

2.2.4 All utility installations on, over, or under highway rights-of-way and attachments to highway structures shall be of durable material designed for long service life expectancy and relatively free from routine servicing and maintenance.

2.2.5 On new installations or adjustments of existing utility lines, provisions shall be made for known or planned expansion of the utility facilities, giving particular attention to those located underground or attached to highway structures. They must be planned so as to minimize hazards and interference with highway traffic when additional overhead or underground lines are installed at some future date.

2.2.6 Any necessary permits, including the accommodation of utilities on highway rights-of-way and environmental controls, shall be the responsibility of the utility.

2.2.7 Underground installations will be so designed that the facility can be located without disturbing the roadway structure. If the installation includes the use of “non-toneable” piping, conduit or direct bury lines, locater lines shall be placed in conjunction with the utility line installation.

Chapter 3 - **Pipelines**

3.1. Location and alignment

3.1.1.1 On longitudinal installations, utility locations are to be adjacent to the outside edge of the rights-of-way and, as is feasibly possible, maintain uniform distances from the centerline of the roadway. The minimum distance between the edge of the pavement and excavation for the pipeline installation shall be three (3) feet.

3.1.1.2 Vertical and horizontal clearance between a pipeline and a structure or other highway or utility facilities must comply with the applicable industry standards for the corresponding facilities.

3.1.2 Cover

3.1.2.1 The top of the pipe shall not project into the pavement sub-base. Installations of encased or uncased carrier pipe under highways shall be installed with a minimum cover, as measured from the top of the pipe to the top of the surface. (See Figure 1a and 1b).

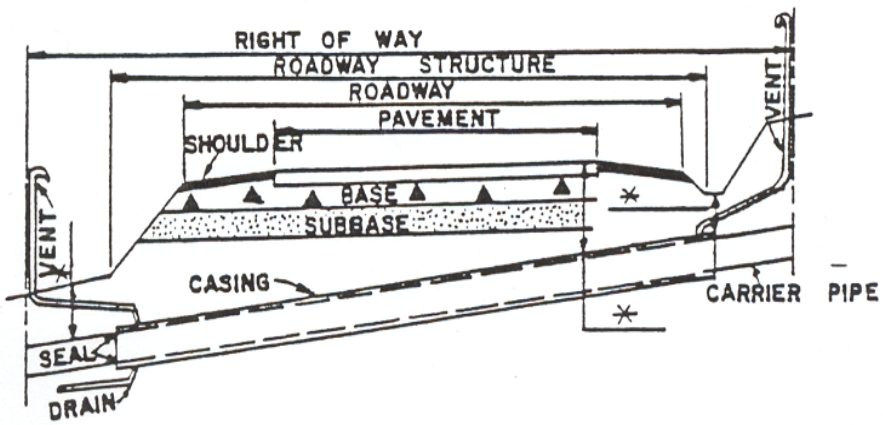
3.1.2.2 On longitudinal installations the critical controls for cover are the depths of lateral drainage facilities, landscaping, buried utility lines, bridge structures, and highway maintenance operations.

3.1.2.3 Due to the nature of the transmittants, location and installation requirements differ. Listed below are specific controls:

3.1.2.3.1 Cover under pavement – four (4) feet minimum for hazardous material; three (3) feet minimum for other lines.

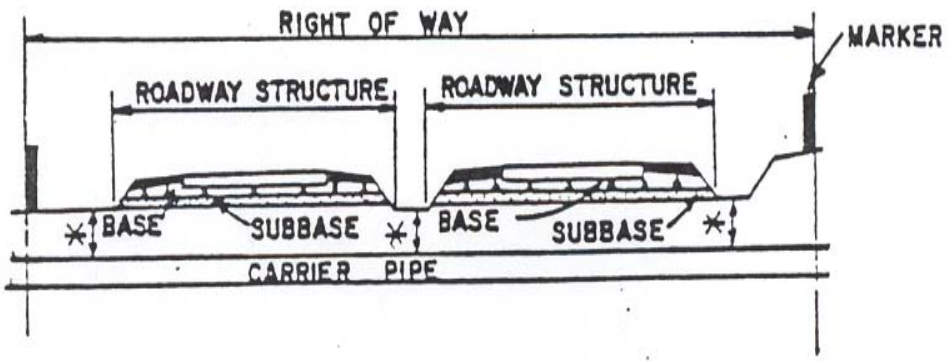
3.1.2.3.2 Cover under other surfaces – three (3) feet minimum for all lines.

3.1.2.4 If the minimum cover, as set forth cannot be obtained, the pipe shall be re-routed. When not practical to re-route, it shall be protected by other measures as outlined herein.



(a) ENCASED CROSSING

***MINIMUM DEPTH OF COVER**



(b) UNCASED CROSSING

***MINIMUM DEPTH OF COVER**

FIGURE 1

EXAMPLES OF FEATURES FOR PIPELINE CROSSINGS

3.2. Methods of Protection

3.2.1 Encasement

3.2.1.1 Encasement (See Figure 2) should be considered for the following highway crossing conditions:

3.2.1.1.1 As a means to expedite installation and reduce inconvenience while avoiding open trenched constructions;

3.2.1.1.2 As protection for carrier pipe from external loads, either during or after construction of the highway or;

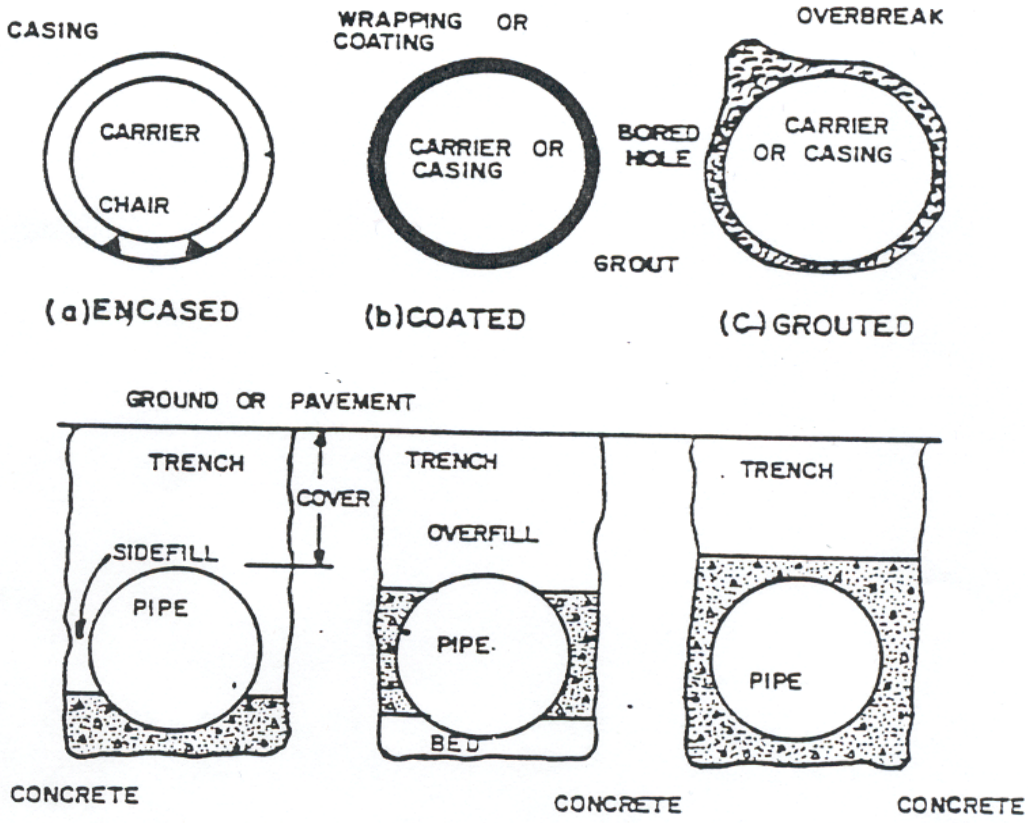
3.2.1.1.3 As a means of conveying leaking fluids or gases away from the area directly beneath the traveled way to a point of venting at or near the rights-of-way line.

3.2.1.2 Encasement shall be required for the following conditions:

3.2.1.2.1 Jacked or bored installations of coated carrier pipes shall be encased. Exceptions may be made where assurance can be provided in writing against damage to the protective coating.

3.2.1.2.2 Lines under freeways, expressways and other controlled access highways. If placed in conjunction with construction of the highway, allied mechanical protection (See Section 3.2.2) may be used in lieu of encasement to protect the pipe but will require justification in writing by the utility and approval by the State Highway Engineer.

3.2.1.3 The Department at its discretion may require encasement of any pressurized carrier pipes or of any carriers transmitting dangerous and deleterious substance under any road.



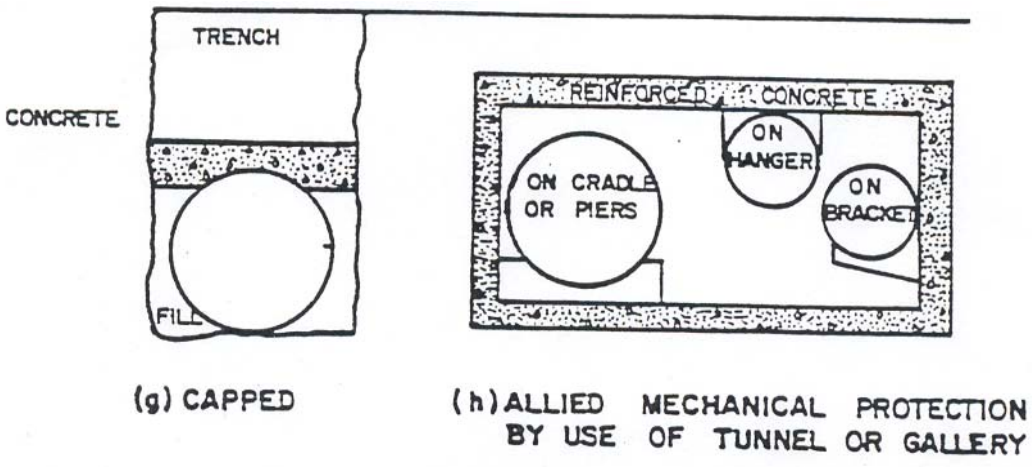


FIGURE 2

EXAMPLES OF ENCASEMENT AND ALLIED MECHANICAL PROTECTION

3.2.2 Allied Mechanical Protection

3.2.2.1 For some conditions pipeline crossings of the highway may be installed without encasement. The following controls are for providing allied mechanical protection to uncased pipeline crossings of the highway:

3.2.2.1.1 On uncased construction, the carrier pipe shall conform to the material and design requirements of utility industry and governmental codes and specifications. In addition, the carrier pipe shall be designed to support the load of the highway plus superimposed loads thereon when the pipe is operated under all ranges of pressure from maximum internal to zero pressure. Such installations shall employ a higher factor of safety in the design, construction, and testing than would normally be required for cased construction.

3.2.2.1.2 Suitable bridging, concrete slabs, or other appropriate measures shall be used to protect existing uncased pipelines which by reason of shallow cover or location make them vulnerable to damage from highway construction or maintenance operations (See Figure 3). Such existing lines may remain in place without further protective measures if they are of adequate depth and do not conflict with the highway construction or maintenance operations, provided both highway and utility officials are satisfied that the lines are, and will remain, structurally sound and operationally safe.

3.2.2.1.3 Uncased crossing of welded steel pipelines carrying transmittants which are flammable, corrosive, expansive, energized or unstable, particularly if carried at high pressure or potential, may be permitted, provided additional protective measures are taken in lieu of encasement. Such measures would employ a higher factor of safety in the design, construction, and testing of the uncased carrier pipe, including such features as thicker wall pipe, radiograph testing of welds, hydrostatic testing, coating and wrapping and cathodic protection.

3.2.2.2 Encasement or allied mechanical protection shall be required for any pipeline:

3.2.2.2.1 With less than minimum cover;

3.2.2.2.2 Near footings of bridges or other highway structures or across unstable or subsiding ground or;

3.2.2.2.3 Near other locations where there may be a hazard as deemed by the Engineer.

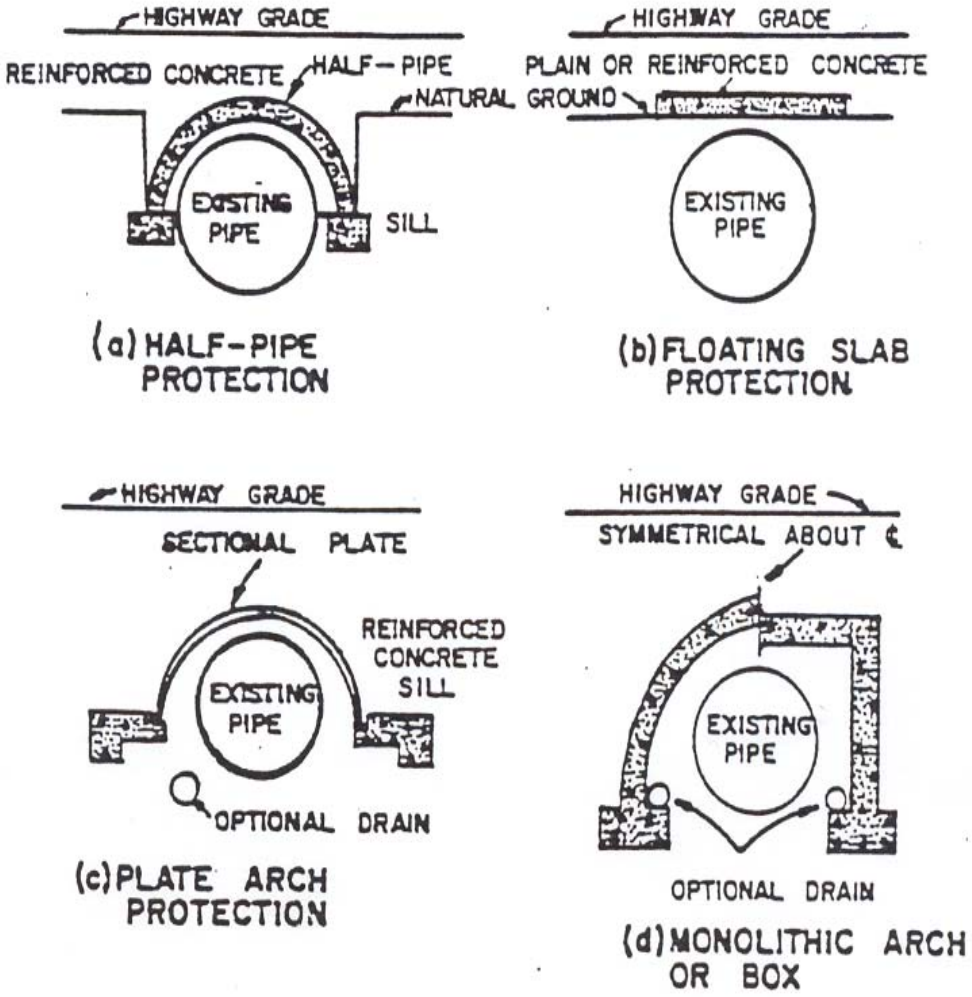


FIGURE 3

EXAMPLES OF PROTECTION OF EXISTING PIPELINES

3.2.3 Design

3.2.3.1 Where encasements are deemed necessary, the casings shall be designed to support the load of the highway and superimposed loads placed thereon and, as a minimum, should equal the structural requirements for highway drainage facilities. Casings shall be composed of materials of satisfactory durability under conditions to which they are exposed.

3.2.3.2 On conventional highways, as a minimum, the casing pipe shall extend to the shoulder break or six (6) feet beyond the edge of pavement on fill slopes, whichever is the greater; three (3) feet beyond the ditch line in cuts; and on curbed sections to the back of the sidewalk area. On freeways, expressways, and other controlled access highways, the encasement will be required to extend to the access control lines, to the outside of frontage roads, or a sufficient distance to allow for future highway improvements. Exceptions to the above defined encasement limits must be justified by the utility company and approved by the State Highway Engineer.

3.2.3.3 The casing pipe shall be sealed at the ends to prevent flowing water and debris from entering the annular space between the casing and the carrier. The installation shall include necessary appurtenances, such as vents and markers.

3.2.4 General

3.2.4.1 When crossing existing roadways, encasement or allied protection is required for all crossings under controlled access roadways and any crossings when transmitting under high pressure. Encasement may not be required for low-pressure hazardous material lines under low volume roads and water or sewer lines under low volume roads.

3.3. Appurtenances

3.3.1.1 Vents should be located at the high end of short casings and at both ends of casings longer than one hundred and fifty (150) feet. Vent standpipes shall be located and constructed so as not to interfere with maintenance of the highway or be concealed by vegetation. Preferably they should be located at the rights-of-way lines. In urban areas, vents should be located where they do not affect pedestrian traffic. [See Figure 1(a).]

3.3.1.2 Markers which are readily identifiable and suitable shall be placed by the utility at the rights-of-way line where it is crossed by pipelines carrying transmittants which are flammable, corrosive, expansive, energized, or unstable, particularly if carried at high pressure or potential, except where a vent will serve as a marker. Markers are also desirable for other pipelines. [See Figure 1(b).]

3.3.1.3 Drains shall be provided for casings, tunnels, or galleries enclosing carriers of liquid, liquefied gas, or heavy gas (See Figure 1).

3.3.1.4 Manholes shall not be located in the pavement or shoulders of major highways, including urban highways. Exception may be made on streets at those locations where manholes are essential parts of existing lines that are permitted to remain in place under existing and proposed roadways. Manholes may be retained or installed within municipalities. Efforts shall be made to minimize such installations and avoid their location at street intersections, insofar as practical. However, manholes will not be allowed in the wheel path of a vehicle. Manholes shall be designed and located in such a manner that will cause the least interference to other utilities and future highway expansion.

3.3.1.5 Shut-off valves, preferably automatic, shall be installed in lines at or near ends of structures and near unusual hazards, unless hazardous segments can be isolated by other sectionalizing devices within a reasonable distance.

3.4. Adjustments to existing pipelines

3.4.1.1 An existing pipeline shall be protected in such a manner as normally would be required for a new pipeline at the site (See Figure 3). It shall be relocated in plan and/or grade when the pipe bedding is inadequate or the pipe does not have sufficient cover as determined herein. If the existing pipeline is not considered adequate to support highway loads, it shall be replaced by stronger pipe or protected in a manner acceptable to both the Department and Utility. A floating slab in lieu of encasement may protect an existing pipeline that lacks adequate cover for protection against vehicular live loads or highway construction operations.

3.4.1.2 Where it is necessary for pipelines to cross Department drainage easements, outside of the roadway rights-of-way, the same minimum depth of cover shall be maintained as required for crossing ditches inside of the rights-of-way. In cases where soil conditions are such that erosion might occur or where it is not feasible to obtain specified depth, it shall be the responsibility of the utility owner to install protective encasement, concrete slabs over the pipe, or take such other measures as necessary for safety to protect the highway and the utility.

3.5. Specific Controls

3.5.1.1 Crossings of existing roadways shall be un-trenched with the following exceptions:

3.5.1.1.1 Hazardous materials – May be open cut on low volume secondary roads when justified in writing and approved by the State Highway Engineer.

3.5.1.1.2 Water – May be open cut on low volume secondary roads or low volume primary routes when justified in writing and approved by the State Highway Engineer.

3.5.1.1.3 Sewer – Gravity flow lines may be open cut, if approved, except on controlled access roadways. Sewer force mains may be open cut on low volume secondary roads when justified in writing and approved by the State Highway Engineer.

Chapter 4 - **Overhead Power and Communication Lines**

4.1. General

4.1.1 The type of construction, vertical clearance above pavement, and location of poles, guys, and related ground-mounted utility appurtenances along the roadside are factors of major importance to preserve a safe traffic environment, the appearance of the highway, and the efficiency and economy of highway maintenance. A critical requirement for locating poles, guys and related facilities along the roadside is the width of the border area, i.e., the space between the edge of the shoulder or curb line and the rights-of-way line, and its availability and suitability for accommodating such facilities. Keeping this space as free as practical from obstacles above the ground enhances the safety, maintenance efficiency, and appearance of highways. Where ground-mounted utility facilities are to occupy this space, they shall be placed at the rights-of-way line except as provided for in Section 4.3. The nature and extent of roadside development and the ruggedness of the terrain being traversed are controlling factors for locating poles, guys, and related facilities at the rights-of-way line.

4.1.2 In the interests of preserving safe roadsides, highway appearance, and efficiency and economy of highway maintenance operations, the following controls shall be used for installations of overhead electric power and communication lines.

4.2. Location

4.2.1 The minimum vertical clearance for overhead power and communication lines above the highway and the minimum lateral and vertical clearance from bridges shall be as required by the National Electric Safety Code or applicable South Carolina Public Service Commission Rules and Regulations.

4.2.2 On and along conventional highways in rural areas, poles and related facilities shall be located at or as near as practical to the rights-of-way

line. As a minimum and where there is sufficient right of way, the poles shall be located outside the clear roadside area for the highway section involved (See Section 2.1.5.) There is no single minimum dimension for the width of a clear roadside area but, where there is sufficient rights-of-way, thirty (30) feet from the pavement edge, is considered a safe design feature. Poles shall be located so as not to interfere with highway drainage facilities or the maintenance thereof. Only one utility pole line will be permitted on each side of the roadway.

4.2.3 Where irregular shaped portions of the rights-of-way extend beyond the normal rights-of-way limits, variances in the location from the rights-of-way line should be allowed as necessary to maintain a reasonable uniform alignment for longitudinal installations (See Section 2.1.2.).

4.2.4 In keeping with the nature and extent of roadside development along conventional highways in urban places, such facilities shall be located at or as near as practicable to the rights-of-way line. Where there are curb and sidewalk sections, the utilities shall be located behind the sidewalks or sidewalk areas. Where it proves impractical to place utilities behind the sidewalks, authorization must be obtained from the Department to place utilities in grass plot areas.

4.2.5 Location of overhead utility installations on highways with narrow rights-of-way or on urban streets with closely abutting improvements are special cases which must be resolved in a manner consistent with the prevailing limitations and conditions. Before locating the utility at other than the rights-of-way line, consideration shall be given to designs employing self-supporting, armless, single pole construction, with vertical alignment of wires or cables, or other techniques permitted by governmental or industry codes that are conducive to a safe traffic environment. Exception to these clearances may be made where poles and guys can be placed at locations behind guardrails, beyond deep drainage ditches or the toe or top of steep slopes, retaining walls, and other similar protected locations.

4.2.6 Except in extreme cases and then only when specifically authorized, guy wires to ground anchors and stub poles must not be placed between a pole and the traveled way where they encroach upon the clear roadside area.

4.2.7 Longitudinal installations of poles, guys, or other related facilities shall not be located in a highway median. On crossings of a highway, any such facilities shall not be located in a highway median within the clear zone width for each direction of travel. Poles and other appurtenances for highway lighting may be located in the median if of a breakaway type; but otherwise, only if other alternatives are determined to be impractical and provided suitable protection is afforded highway traffic.

4.3. Lighting

4.3.1 Lighting systems for illuminating the rights-of-way shall be approved by the Department. Single lamp illumination over the rights-of-way placed on existing poles will be permitted if installed and maintained by a governmental body or utility company; they are placed so as to meet vertical clearance requirements above the roadway; are mercury vapor or high pressure sodium type illumination with a light diffusing globe refractor; and do not hinder the visibility of the motorists. Support poles for roadway illumination may be allowed where the need for it is properly documented, and provided traffic safety and roadway clearance requirements are met. Breakaway support poles would be required if located within the clear roadside area.

Chapter 5 - **Underground Electric Power and Communications Lines**

5.1. General

5.1.1 There is wide variation in the techniques and practices for installing underground electric power and communication lines due to differences in such factors as water conditions, type of subsoil, facility congestion and the like. Accepted methods for undergrounding such lines include: trenching for conduit or duct construction for uncased buried cable; plowing for direct burial of cable; jacking or pushing of pipe as conduit, especially for crossings of existing highways; and small boring without conduit on highway crossings where soil conditions permit. The following controls are for the installation of underground electric power and communication lines:

5.1.1.1 Underground utility construction shall conform to all applicable codes, standards, and specifications.

5.1.1.2 The minimum depth of bury for cased and uncased construction shall conform to the following: On longitudinal installations the depth of bury shall be a minimum of thirty (30) inches. On crossing of highways, the minimum depth of bury shall be thirty-six (36) inches below the lowest point of the roadway cross-section unless mechanical protection is provided. Plowing through pavements, including paved driveways, shall not be permitted.

5.1.1.3 Pedestals or other above ground utility appurtenances installed as part of buried cable plant shall be located at or near the rights-of-way line, outside of the clear zone and highway maintenance operating area.

5.1.1.4 All proposed locations and utility designs shall be reviewed by the Department to ensure that the proposed construction will not cause avoidable interference with existing or planned highway facilities or with highway operation or maintenance.

5.1.1.5 On either cased or uncased installations, particularly on crossings of the highway, consideration shall be given for placing spare conduit or duct to accommodate known or planned expansion of underground lines.

5.1.1.6 The controls previously outlined for electric power and communication line attachments to highway bridge structures shall be followed. (See Section 7.1 - “Installation on Highway Structures.”)

5.1.1.7 The general controls previously outlined for pipelines as related to markers, installation, trenched and untrenched construction, and adjustment shall be followed as applicable, on underground installations of electric power and communication lines.

5.2. Location and Alignment

5.2.1 On longitudinal installations, locations parallel to the pavement at or adjacent to the rights-of-way line are preferable so as to minimize interference with highway drainage, the structural integrity of the traveled way, shoulders and embankment, and the safe operation of the highway. When, however, it is not feasible to install cables outside of the ditch line, they must be placed as far away from the edge of the pavement as is practicable but under no conditions can the distance between the edge of the pavement and the near edge of a ditch measure less than three (3) feet. Cable plowing will not be permitted in the shoulder of roadway fills over ten (10) feet in height. Trenches will be compacted as described in trenched construction. (See Section 8.1.1)

5.2.2 Crossing shall be located as near perpendicular to the highway alignment as is practicable.

5.2.3 Conditions that are generally unsuitable or undesirable for underground crossings shall be avoided. These include locations such as in deep cuts; near footings of bridges and retaining walls; across at-grade intersections or ramp terminals; at cross drains where flow of water, drift, or stream bed load may be obstructed; within basins of an underpass drained by a pump; and in wet or rocky terrain where it will be difficult to attain minimum bury.

5.3. Adjustments to Existing Lines

Existing lines will be allowed to remain provided they do not interfere with construction and the owner can prove that said lines are constructed of suitable material to withstand traffic loads and construction activities. Manholes will be located so as to minimize interference with traffic during necessary access to the line. (See Section 3.1)

Chapter 6 - **Irrigation and Drainage Pipes, Ditches and Canals**

6.1.1 Irrigation and drainage facilities installed across highway rights-of-way generally shall be designed and constructed in accordance with the Department's specifications for highway culverts. Ditches and canals that closely parallel the highway shall not be permitted. Appurtenances that would constitute a hazard to traffic shall not be permitted within the clear roadside area and preferable shall be located outside of the rights-of-way.

6.1.2 Where ditch rider roads are adjacent to ditches or canals that cross the highway, consideration shall be given to safety, traffic operations, and economic features when providing for the continuity of such roads. For example, the enlargement of drainage structures to accommodate the crossing of ditch rider roads would rarely be economically justified.

6.1.3 These ditches or drainage structures will be constructed and maintained so as not to interfere with highway drainage, and will be done so at the expense of the permittee. The altering of existing highway drainage structures or ditches will be at the permittee's expense. New and altered drainage on or across the rights-of-way will require approval of the Department, and property owners adjacent to and down stream from the drainage change. The Department will maintain altered ditches and structures only to the extent necessary to provide drainage as originally constructed for the highway. Any damage or liabilities resulting from this construction or installation by the permittee will be the responsibility of the permittee.

Chapter 7 - **Miscellaneous**

7.1. Installations on Highway Structures

7.1.1 In some cases, attachment of utility facilities to highway structures, such as bridges, is a practical and necessary arrangement and may be permitted by encroachment permit where found to be in the public interest. However, attaching utility lines to a highway structure can materially affect the structure, the safe operation of traffic, the efficiency of maintenance, and the appearance. Therefore, where it is feasible and reasonable to locate utility lines elsewhere; attachments to bridge structures should be avoided. Attachment of utilities on the inside of culverts will not be allowed.

7.1.2 Where other locations for a utility line to span an obstruction prove to be difficult, unreasonably costly, present a danger to public, or interfere with traffic, consideration will be given for attaching the utility line to a bridge structure by a method acceptable to and approved by the Department. Since highway structure designs and site conditions vary, the adoption of a standard method to accommodate utility facilities is not feasible but the method employed should conform to logical engineering considerations for preserving the highway, its safe operation, maintenance and appearance. Generally, acceptable utility installations are those that will occupy a position beneath the structure's floor, between the outer girders or beams or within a cell, and at an elevation above low superstructure steel or masonry. All exposed metal utility hangers and/or attachments shall be galvanized or of stainless steel construction to prohibit corrosion.

7.1.3 The general controls for providing encasement, allied mechanical protection, and shut-off valves use should be followed for pipeline attachments to bridge structures. (See Chapter 3, Pipelines.)

7.1.3.1 Where a pipeline attachment to a bridge is cased, the casing shall be effectively opened or vented at each end to prevent possible buildup of pressure and to detect leakage of gases or fluids.

7.1.3.2 Where a casing is not provided for a pipeline attachment to a bridge, additional protective measures shall be taken. Such measures shall employ a higher factor of safety in the design, construction, and testing of the pipeline than would normally be required for cased construction.

7.1.4 Communication, high pressure gas lines, sewer lines, and electric power line installations on structures will not be considered except in extreme cases where placing them elsewhere is not feasible or would be extremely costly. Requests for installations on structures must be fully justified in writing by the utility companies.

7.1.4.1 Those installations that are allowed shall be suitably insulated, grounded (in the case of a bridge, ground at each end) and carried in a protective conduit or pipe from the point of exit from the ground to the point of re-entry. Preferably the protective conduit or pipe shall be carried to a manhole located beyond the backwall of the structure.

7.1.5 Encroachment permits shall indicate the weight per linear foot of the utility, any encasement proposed, and its weight per linear foot. A detailed drawing of the method of attachment to the bridge as well as location shall be provided. Placement of utilities on existing structures shall receive approval of the Bridge Maintenance Engineer prior to the approval of the encroachment permit. The Bridge Design Engineer shall approve the installation of utilities on all new structures.

7.1.6 All costs of installing and maintaining any utilities to the bridge structures shall be at the expense and effort of the utility company. Failure to maintain such utility in an acceptable manner shall be grounds for revoking the encroachment permit and removal of the

utility at the utility company's expense. Any damages or weakening of the structure resulting from installation or maintenance of the utility will be corrected at the expense and effort of the utility company.

7.2. Scenic Enhancement

7.2.1 The type and size of utility facilities and the manner and extent to which they are permitted along or within highway rights-of-way can materially alter the scenic quality, appearance, and view of highway roadsides and adjacent areas. For these reasons additional controls are applicable in certain areas that have been acquired or set aside for their scenic quality. Such areas include scenic strips, overlooks, rest areas, recreation areas, the rights-of-way of highways adjacent thereto, and the rights-of-way of sections of highways which pass through public parks and historic sites.

7.2.2 New underground utility installations may be permitted within such lands where they do not require extensive removal or alteration of trees or other natural features visible to the highway user or if they do not impair the visual quality of the lands being traversed.

7.2.3 New aerial installations shall not be used at such locations where there is a feasible and prudent alternative to the use of such lands by the aerial facility. Where this is not the case, aerial facilities shall be considered only where:

7.2.3.1 Other locations are unusually difficult and unreasonably costly, or are more undesirable from the standpoint of visual quality,

7.2.3.2 Undergrounding is not technically feasible or is unreasonably costly, and

7.2.3.3 The proposed installation can be made at a location and will employ suitable designs and materials that give adequate attention to the visual qualities of the area being traversed.

7.2.4 These controls shall also be followed in the location and design of utility installations that are needed for a highway purpose, such as for continuous highway lighting, or to serve a weigh station, rest or recreational area.

7.3. Preservation, Restoration and Cleanup

7.3.1 Disturbed Areas:

7.3.1.1 The area disturbed by utility installations or relocations shall be kept to a minimum. Restoration methods shall be in accordance with the Department specifications and/or special provisions in utility use and occupancy agreements.

7.3.1.2 All land disturbing activities on rights-of-way of the Department must be performed in a manner that erosion is controlled and sediment is retained on the site concerned to the maximum extent feasible and stormwater is managed in a manner such that neither any significant on-site nor off-site damage and/or problem is caused or increased.

7.3.1.3 Construction plans for work to be performed on the Department rights-of-way must include designs to manage stormwater runoff and control erosion and sedimentation using state-of-the-art practices.

7.3.1.4 Prior to the start of construction, the permittee must submit in writing to the Engineer, for approval, his schedule for the accomplishment of temporary and permanent erosion and sediment control and stormwater management for the work to be performed. This is not necessary for service connections.

7.3.1.5 During construction, work must be scheduled and conducted in such a manner as to minimize soil erosion and control runoff, with particular attention to prevent contamination and depositing of sediment in adjacent streams, watercourses, lakes, ponds and other water impoundments or onto adjacent properties, and to prevent on-site and off-site damage from stormwater runoff. Temporary and permanent measures to control erosion and sedimentation and manage stormwater runoff must be carried out

in conjunction with clearing, grubbing and other earthwork operations and throughout the life of the project. Temporary measures such as berms, dikes, slope drains, terraces, earth rolls, sedimentation basins and temporary seeding must be provided until permanent drainage facilities and erosion control features are completed and operative. Permanent devices or measures such as culvert pipes, terraces, gutters, bituminous curbs, permanent slope drains, riprap and permanent vegetation must be used and must be incorporated as soon as feasible.

7.3.1.6 The permittee must periodically inspect work performed to insure that the necessary erosion control measures are implemented and are adequate for the needs of the site and affected off-site areas. Additional measures will be implemented in the event that the measures included in the plan are not sufficient to adequately control erosion and sedimentation and manage stormwater runoff.

7.3.1.7 It will be the responsibility of the permittee to maintain the disturbed areas until permanent erosion control measures are in effect and functioning satisfactorily.

7.3.2 Drainage:

7.3.2.1 Care shall be taken in utility installations to avoid disturbing existing drainage facilities. Underground utility facilities shall be backfilled with pervious material and outlets provided for entrapped water. Underdrains shall be provided where necessary. No jetting or puddling shall be permitted under the roadway.

7.3.3 Spraying, Cutting and Trimming of Trees:

7.3.3.1 The utility shall be prohibited from such activities unless the State Highway Engineer or his/her designee gives written permission. In general, where permission is given only light trimming shall be permitted. When the removal of a tree is permitted, the stump shall either be cut to the ground or be removed and the hole properly

backfilled, as determined by the Department. All debris, refuse and waste shall be removed from the site.

7.4. Safety and Convenience

7.4.1 Control of traffic:

7.4.1.1 Traffic controls for utility construction and maintenance operations shall conform to the *Manual on Uniform Traffic Control Devices* (MUTCD). All construction and maintenance operations shall be planned with full regard to safety and to keep traffic interference to an absolute minimum. On heavily traveled highways, construction operations interfering with traffic shall not be allowed during periods of peak traffic flow. Any such work must be planned so that closure of intersecting streets, road approaches, or other access points is held to a minimum.

7.4.1.2 The utility firm or permittee shall provide, erect and maintain all necessary barricades, lights, danger signals, signs and other control devices, provide qualified flaggers and watchmen where necessary; shall take all necessary precautions for the protection of the work, the warning that work is under construction, and the safety of the public. Suitable advance warning signs shall be erected in advance where operations interfere with the use of the road by traffic. Lane closures (or partial closures) will not be permitted unless provided for in the permit. Where a lane (or a portion of a lane) is closed, traffic control devices and flaggers shall be used in accordance with the MUTCD. All barricades, signs and traffic control devices shall conform to the requirements of the MUTCD.

7.4.1.3 When equipment is not in use (on roadways open to public travel), equipment and vehicles shall be kept at least 30 feet from the edge of the travel lanes. On Interstate routes or freeways, no vehicles or equipment will be permitted on the shoulders at any times.

7.4.1.4 The Department may suspend the work if traffic control devices are not used and maintained in accordance with these provisions.

7.4.2 Servicing maintenance and repairs:

7.4.2.1 All utility facilities shall be kept in good state of repair both structurally and from the standpoint of appearance. No work shall be performed until sufficient notice has been extended to local Department personnel.

7.4.3 Permanent markers:

7.4.3.1 Permanent markers identifying the horizontal and vertical locations of new underground utilities, both crossings and longitudinal installations, shall be placed, where appropriate, by the utility. Markers shall be installed in such a manner as to not interfere with highway maintenance operations, preferably at the rights-of-way line.

7.4.4 Records:

7.4.4.1 Records shall be maintained by the utility owner that describe the utility, usage, size, configuration, material, location, height or depth, and any special features such as encasement. This information should be in a reproducible form available to other utilities and highway agencies.

7.4.4.2 The utility owner shall also submit to the SCDOT as-built drawings of all underground power installations within SCDOT rights-of-way upon the completion of the work.

7.5. <u>Construction Identification of Utilities:</u>

7.5.1 When it is likely that construction or maintenance activities will involve underground utilities, provisions of the S.C. Code of Laws Title 58, Chapter 35 entitled “Underground Utility Damage Prevention Act” shall be followed. The location of each

underground utility shall be identified by the respective owners with stakes, paint or other temporary on the surface markings, color-coded by utility type. The markings shall be in accordance with the APWA uniform color code system for marking underground utility lines which is as follows:

7.5.2 Red - Electric power lines, cables, conduits and lighting cables – distribution and transmission, municipal electric systems.

7.5.3 Yellow - Gas, oil, steam, petroleum or gaseous materials – distribution and transmission , all pipelines carrying hazardous or dangerous materials including petroleum products, steam and compressed air or compressed gases.

7.5.4 Orange - Communications lines including telephone and telegraph systems, police and fire communications, cable television.

7.5.5 Blue - Potable water systems.

7.5.6 Green - Storm and Sanitary Sewers.

7.5.7 Purple - Reclaimed water, irrigation and slurry lines.

7.5.8 Pink - Temporary survey markings

7.5.9 White - Proposed excavation

Chapter 8 - **Construction Techniques**

8.1. Pipelines

8.1.1 Trenched Construction and Backfill

8.1.1.1 Considerations

8.1.1.1.1 Often times soils removed from the trench during excavation of the trench are not suitable as backfill soil. From the highway viewpoint for trench and backfill construction, the integrity of the pavement structure, shoulders, and embankment slopes are of primary concern.

8.1.1.2 Controls for trenched construction

8.1.1.2.1 The trench shall be cut to vertical faces where soil and depth conditions permit, with a maximum width of the outside diameter of the pipe, plus two (2) feet. The vertical faces shall be shored meeting Occupational Health and Safety Act requirements, where necessary, and lateral and vertical support must be provided for all existing facilities and structures. Excavation shall be no closer than three (3) feet from the edge of pavement or back of curb on trenches cut parallel to the roadway. All fill soils and excavated soils shall be placed on the side of the trench away from the pavement. The pavement will be kept clean of mud, debris, etc.

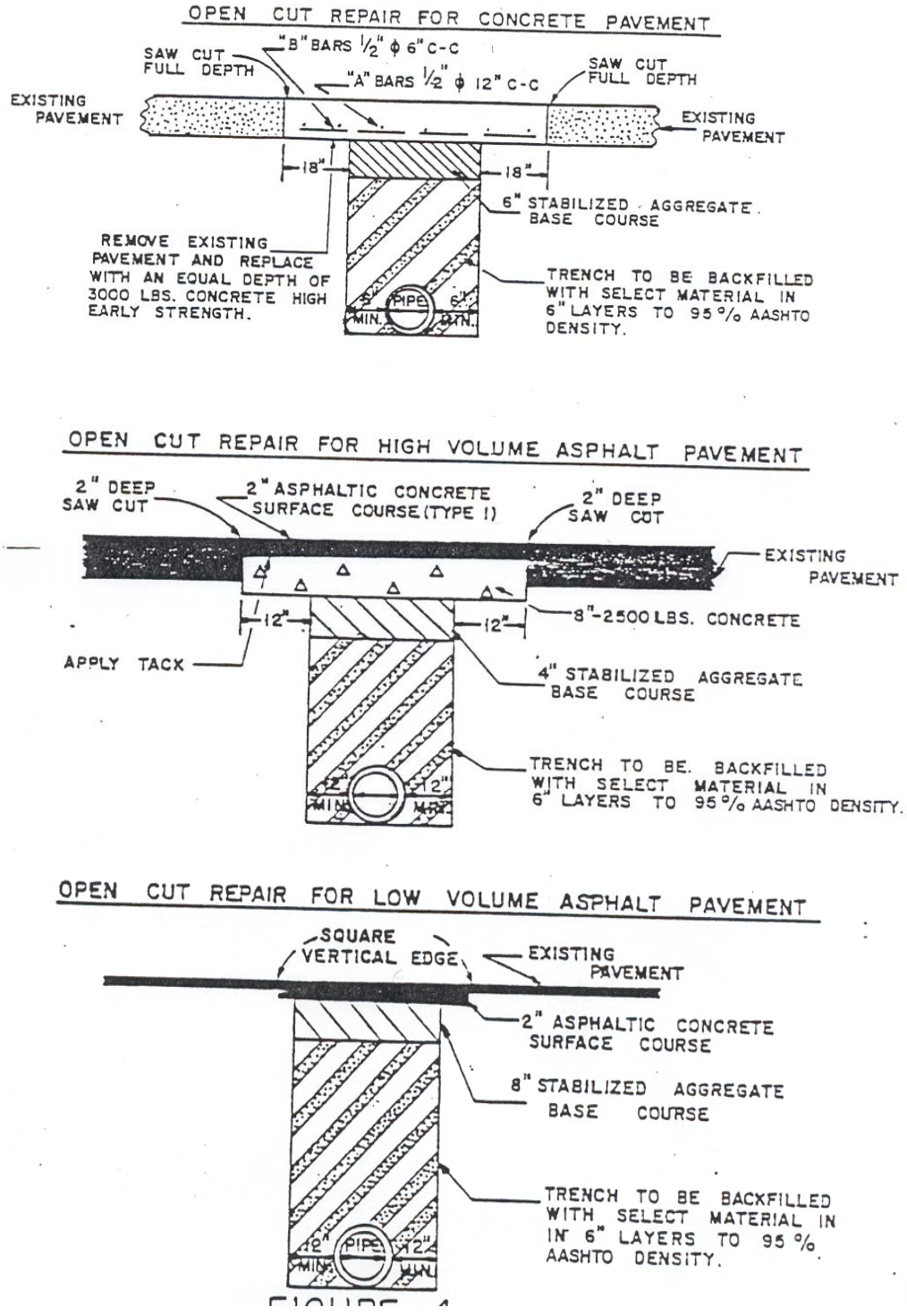
8.1.1.2.2 Bedding shall be provided for six (6) inches or ½ the diameter of the pipe whichever is less. Bedding shall consist of granular material free of lumps, clods, stones, and frozen material and prepared to provide the pipe with uniform support throughout its length. Unstable soils and rock ledges should be sub-excavated from the bedding zone and replaced by suitable material.

8.1.1.2.3 Backfilling of trenches is to be accomplished immediately after placement of the pipe. Trenches will not be left open during hours of darkness. Backfill is to be placed in six (6) inch layers or less with each layer being thoroughly tamped and compacted. Care

should be exercised to thoroughly compact the material around and over the pipe. Each layer will be compacted to a density of 95% as determined by AASHTO Method T-99, if required by the Department. All work shall be performed to the satisfaction of the Department. Trench soil (or a substituted suitable material used for backfill) must be capable of producing the required compaction.

8.1.1.3 Pavement cuts

8.1.1.3.1 No open cuts in the pavement will be permitted except by permission of the Department. Where pavement is to be cut, the work shall be done in clear weather when traffic is lightest. Materials and methods of compaction shall be adapted to achieve prompt restoration of traffic service. Signing and warning devices will be supplied by the utility company or its contractor and will be in compliance with the MUTCD. Traffic will be maintained at all times and lane closures will only be permitted after the Department approves a traffic control plan. Driveways will be maintained so as to permit ingress and egress to properties adjacent to the roadway. Blocking or closing of a driveway will not be permitted without the approval of the property owner. Restoration will be performed as shown in Figure 4 or as specified by the Department.



PAVEMENT REPAIRS

FIGURE 4

8.1.1.3.2 The entire surface of asphalt roadways will be overlaid one year after initial restoration of pavement on all longitudinal cuts or if seven (7) or more perpendicular cuts are made within a 500-foot section of roadway unless the road is scheduled to be resurfaced or in dire need of resurfacing. The Department at the time of the encroachment permit application will determine the need and extent of resurfacing required by the permittee. Initial restoration shall be maintained in good condition by the permittee for the period prior to resurfacing. Repairs as necessary shall be made immediately upon discover. The Department will inspect the initial repair to insure it is in satisfactory condition prior to resurfacing. Where the pavement cut is not to be resurfaced, it will be maintained for two (2) years or until the cut is satisfactorily restored.

8.1.1.3.3 Base and surfacing for asphalt driveway repairs shall consist of six (6) inches of stabilized aggregate base course and 150 pounds of asphalt concrete surface course unless otherwise specified by the Department.

8.1.2 Un-trenched Construction and Grouting

8.1.2.1 Techniques that may be used for installing pipeline under a highway without disturbing the surface are indicated below:

8.1.2.1.1 Driving – A small pipe with a pilot shoe can be driven through compressible soils by a steady thrust, hammering, or vibrating. A casing or corrosion resistance carrier must be used.

8.1.2.1.2 Coring – A small casing without pilot shoe can be drilled into more difficult soil, which enters the pipe as it advances. The core is removed by sluicing during or after drilling.

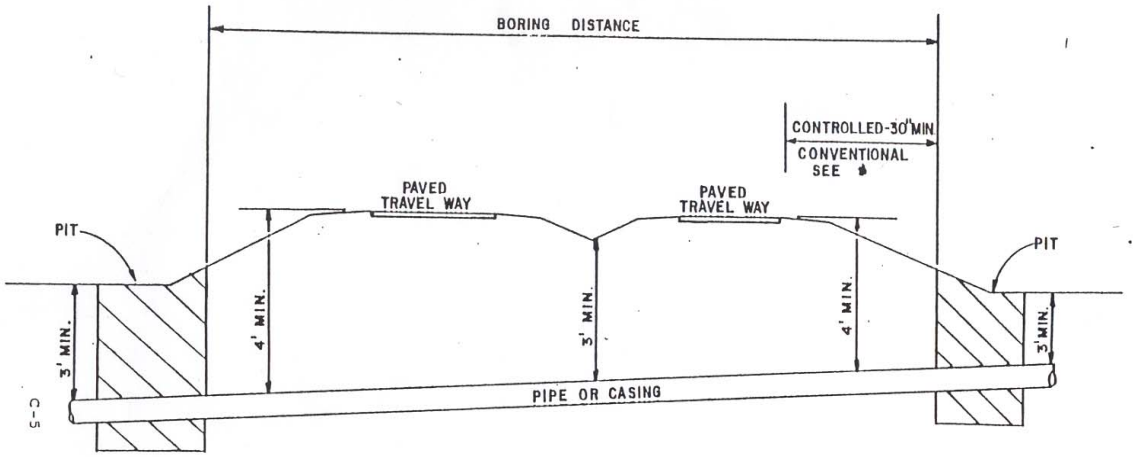
8.1.2.1.3 Boring – Larger pipes can be jacked through oversize bores carved progressively ahead of the leading edge of the advancing pipe as spoil is mucked back through the pipe.

8.1.2.1.4 Wet boring – This method is not allowed.

8.1.2.2 Controls for un-trenched construction and grouting

8.1.2.2.1 Un-trenched construction shall be required as described in the section on Encasement and Allied protection – Sections 3.2.

8.1.2.2.2 Portal limits (temporary access points, bore pits, etc.) of pipeline crossings shall be established safely beyond the surfaced area of the highway so as to avoid impairing the roadway during installation of the pipeline. The near edge of portals shall be no closer than thirty (30) feet to the edge of pavement on controlled access highways and no closer than five (5) feet on conventional highways. Adequate protection and warning devices will be provided while the portal is open. Bulkheading is required on any location nearer than five (5) feet or where the horizontal distance from the edge of pavement is less than the vertical differences in elevation between the surfaced area of the highway and the pipeline. (See figure 5).



*THE NEAR EDGE OF THE PIT CAN BE NO CLOSER TO THE EDGE OF THE TRAVELWAY THAN ITS DEPTH BELOW THE SURFACE OF THE TRAVELWAY UNLESS BULKHEADED.

NOTE: ILLUSTRATION IS FOR HAZARDOUS MATERIAL CROSSING.

FIGURE 5

DETAIL FOR BORING PIT LOCATION

8.1.2.2.3 The oversize of the boring excavation shall be restricted and the conditions specified under which the void outside the carrier must be backfilled with grout. Where the soils are favorable and the carrier is four (4) feet or more deep, the boring hole may be five percent (5%) oversize in diameter. Grout backfill should be considered for pipes more than twelve (12) inches in diameter and for overbreaks, unused holes, or abandoned pipes.

8.1.3 Utility tunnels and bridges

8.1.3.1 A utility tunnel or a bridge occasionally is provided for a pipeline crossing a freeway at a strategic location. Where it can be foreseen that several utility crossings will be needed, the cost of the tunnel (either a large casing or a box culvert) or of the bridge, may be less than that for the alternate of several un-trenched or separately encased pipelines. Where these conditions exist, adequate study is to be made by the utilities to anticipate their needs for future crossings and to converge their facilities to a joint use single crossing.

8.1.3.2 In a combined tunnel or bridge, provisions shall be made to isolate mutually hazardous transmittants, such as fuels and electric energy, by compartmentalizing or by auxiliary encasement of incompatible carriers.

8.1.3.3 The utility-tunnel or utility-bridge structure shall conform with the Department's standard practices and design with regard to appearance, location, bury and earthwork.

8.1.4 General

8.1.4.1 Subject to safety regulations adopted by the State or the Federal Government, the following precautionary measures shall be used for pipeline installations:

8.1.4.1.1 Pipeline installation permits shall specify the class of transmittant, the maximum working, test, or design pressures, and the design standards for the carrier.

8.1.4.1.2 When it is anticipated that there will be a change in the class of transmittant or an increase in the maximum design pressure specified in the permit, the utility shall be required to give the Department advance notice and obtain approval for such changes. The notice shall specify the applicable codes to be used.

8.2. Overhead Electric Power and Communication

8.2.1 Except in extreme cases, and then only with specific authorization, longitudinal installations of overhead lines on the highway rights-of-way shall be limited to single pole type of construction.

8.2.2 Unless not practical, joint use single pole construction shall be followed, as indicated by Part 2 of the National Electrical Safety Code, at locations where more than one utility or type of facility is involved. This is of particular significance at locations where the rights-of-way widths approach the minimum needed for safe operations or maintenance requirements or where separate installations may require extensive removal or alteration of trees.

8.3. Underground Electric Power and Communication

8.3.1 Where it is acceptable to both the utility and the Department, underground crossings of the highway may be installed without protective conduit or duct. Normally such installations shall be limited to open trenched construction or to small bores for wire or cable facilities, where soil conditions permit installation by boring a hole about the same diameter as the cable and pulling the cable through. Open trench construction will not be allowed across completed pavements unless specifically authorized by the State Highway Engineer.

8.3.2 Where crossings of underground lines are encased in protective conduit or duct, the encasement shall comply with the requirements of Section 3.2, Pipelines. Where appropriate, the encasement shall extend to the access control lines, to the outside

of frontage roads, or to an indicated line that allows for future widening of the highway. On conventional highways, the encasement shall extend six (6) feet beyond the edge of pavement or two (2) feet behind outer curb line.

8.3.3 Consideration shall be given to encasement or other suitable protection for any wire or cable facilities (a) with less than minimum bury, (b) near the footings of bridges or other highway structures, or (c) near other locations where there may be a hazard.

8.3.4 Where uncased bored installations are proposed by the utility, the utility shall be required to furnish information as to the controls and construction methods to be employed, before the proposed installations are considered by the Department. This is to ensure the necessary protection of the utility facility and the integrity and operation of the highway facility.

8.4 Horizontal Directional Drilling (HDD)

8.4.1 Approval of the encroachment permit to perform horizontal directional drilling does not implicate SCDOT in the safety of the installation or the operation of the installed pipe. The utility company will indemnify SCDOT from any liability incurred due to the installation and operation of their pipe within SCDOT right of way.

8.4.1.1 A permit applicant will be required to purchase and maintain, in a company or companies acceptable to SCDOT, comprehensive general liability insurance covering claims by SCDOT and third parties for property damages and personal injury, including death, that may arise out of the applicant's work under the permit (whether performed by its own forces or its contractors or agent). Such insurance shall be issued on an occurrence-based not claims made basis, and in at least the following amounts:

Each Occurrence - $1,000,000
General Aggregate - $2,000,000
Completed Operations - $2,000,000

Applicant shall provide, in a form acceptable to SCDOT, Certificate of insurance showing SCDOT as a certificate holder and copies of the completed operations endorsements verifying that such insurance has been obtained.

8.4.2 All lines will be categorized based upon the utility contained in the pipe. Table 1 details the utility pipe categories.

TABLE 1
CATEGORIES FOR DIRECTIONAL DRILLED UTILITY PIPE

Category	Carrier pipe contents
Pressurized Liquid	Water, Forced Sanitary Sewer, etc.
Gravity Flow Liquid	Sanitary Sewer, etc.
Pressurized Gas	Natural Gas, etc.
Telecommunications and Power	Electric, Phone, Cable, Fiber Optics, etc.

8.4.2.1 For the carrier pipes under pavement, and where directed below, install casing to extend to limits of the SCDOT right of way or where approved by the SCDOT Utility Engineer. All parallel installations to the roadway do not require a casing. For parallel installation in the shoulder of the road the minimum depth shall be 48 inches and for installations between the ditch-line to the right of way line, the depth shall be 36 inches. For new installations tying to existing lines the utility company can request a wavier to this depth requirement.
Table 2 details casing requirements.

TABLE 2
CASING REQUIREMENTS FOR DIRECTIONAL DRILLED UTILITY PIPE

Category	Casing pipe is required when carrier pipe diameter is
Pressurized Liquid	3” and larger
Gravity Flow Liquid	8” and larger
Pressurized Gas	8” and larger
Telecommunications and Power	Casing not required

8.4.2.2 Casing pipe is intended to serve as a conduit for carrier pipe to minimize the need for additional trenchless installations due to line replacement. Where possible, replace damaged pipe within the same casing as the original installation. In the event that original carrier pipe must be abandoned, remove carrier pipe from casing pipe and completely fill remaining pipe with flowable fill.

8.4.2.3 Casing pipe may be the same material as the carrier pipe. Casings can be HDPE, MDPE, steel or an approved equal. Casing pipe must be rated to carry the same internal and external pressures as the carrier pipe. When casing pipe is required, install vents in the casing pipe at the Right-of-way limits or where approved by the SCDOT.

8.4.3 Only perpendicular crossings will be allowed. Any other type crossing will be evaluated on a case by case basis for non-controlled access roads only. Variances from this specification must be requested in writing to the SCDOT Utility Engineer for review and approval.

8.4.4 Evaluate each pipe material using SCDOT Structural Loading Criteria. Perform one set of calculations for each different material, diameter, and wall thickness to be used. Follow SCDOT Instructional Bulletin 2007-04 to determine minimum load cases. Include allowable maximum installation stress load case in structural calculations. In addition, provide documentation that pipe joints meet or exceed the performance of the pipe, or base calculations on pipe joint capacity. Provide a copy of these one time calculations and a summary fill height table to the SCDOT Utility Engineer. Do not exceed the limits of the calculated fill height table and installation stresses for any installation. Fill height table may be published for uniform application statewide.

8.4.5 Table 3 details the recommended minimum depths below the lowest point on the road cross-section. Greater depths may be required due to obstructions or site specific considerations. Service lines less than 2 inches will not require the full engineering document as outlined for bores greater than 2 inches.

TABLE 3
MINIMUM COVER FOR DIRECTIONAL DRILLED UTILITY PIPE

Carrier pipe diameter	Minimum Cover
2 inches up to 6 inches	4 feet
greater than 6 inches up to 14 inches	10 feet
greater than 14 inches up to 24 inches	15 feet
greater than 24 inches up to 48 inches	25 feet

8.4.6 The permit application submittal must include at a minimum the following information:

- Utility owner and contractor name
- Utility category
- Carrier pipe properties (material, diameter, wall thickness)
- Site layout plan, project schedule and company experience record
- Location of entry and exit points, access pit locations, and equipment and pipe layout areas
- Proposed drill path alignment (both horizontal and vertical) to include the lowest point of the roadway cross section

- The location and clearances for all existing utility crossings, structures, SCDOT drainage systems, foundations, sign and guardrail posts at the site, etc. SCDOT recognizes that supplying this information to far in advance may not be accurate when the contractor begins the drilling operation therefore, this information can be submitted with the notification to the Resident Maintenance Engineer at least 48 hours before drilling commences
- Depth of cover over the casing
- Provide soil classification to a depth of five feet below the proposed drill elevation. For depths up to six feet the soil classification can be obtained from USGS maps. When geotechnical borings are used, provide soil boring plan and report.
- Supply the theoretical amount of drilling fluid to be used during the drilling operation (calculation based on drilling diameter and number of pre-reams)
- Supply data sheet showing the actual amount of drilling fluid used during the drilling operation
- Provide the source of the make up water for the drilling fluids
- Supply field pH and hardness reading for the make up water, drilling fluids on the data sheet each time new fluids are mixed
- On systems that recycle drilling fluids, complete testing logs shall be filled out to verify that the drilling fluids are being maintained in accordance with the original mix or to demonstrate the reason for changing the drilling fluid mix during the completion of the pull
- Carrier pipe diameter, length, material, wall thickness, method of jointing, and pipe ream diameter for proposed directional drill
- Certification that carrier pipe and casing pipe (where applicable) has been checked for SCDOT Structural Criteria and that a copy of these calculations is on file with the SCDOT Utility Engineer.

- Detailed pipe calculations confirming ability of carrier pipe and/or casing pipe (including joints) to withstand installation loads
- Proposed and actual viscosity, density, and composition of drilling fluids whether they are bentonite or polymer based (based on soil analysis)
- Name of drilling fluids being used for drilling (Company Name), Name of the field Representative (drilling fluids manufacturer) that will provide the technical support, fluids testing and recommendations as needed during the drilling and pulling phase
- Construction method including diameter of pilot hole, number and size of pre-reams
- Drilling fluid pumping capacity in gallons per minute (gpm), and gallons per rod (gpr), pressures, and flow rates proposed and actual pumping rates (rates may change as soil conditions and soil types change)
- Show all right-way-lines, controlled access lines, property lines and other utility right-of-way or easements
- Show all elevations including ground profile above proposed drill path, and profile of directional drilling path
- Type and capacity of drilling machine to include the manufacturer, model number, thrust/pullback (in lbs.), maximum torque, drilling speed, drill pipe length, drilling distance and power source. If the information is not available when the Encroachment Permit is submitted the utility can submit the information after the contractor is selected but no later than 48 hours before the work begins.
- Type of tracking method/system, operation range and accuracy
- Type and capacity of mud mixing system
- A detailed plan for monitoring ground surface movement (settlement or heave) due to the drilling operation at the time of drilling and subsequent to the drilling operation being completed
- Contingency plan for frac-out or drilling hole failure
- Traffic control plan when applicable

- Field pressure test all carrier pipe installed to carry pressurized liquids in accordance with standard practices of the requesting permittee.
- Disposal plan for spent drilling fluids, i.e.: (land farming, landfill, etc.)
- Confirm the drilling unit is equipped with an electrical strike safety package and a safety plan in the event of an electrical strike

8.4.7 Upon completion of the drilling operation supply accurate as built drawing within 30 days to the State Utility Engineer. The as-built drawings must include the following information:

- Actual path alignment
- coordinate geometry of the utility
- latitude
- longitude
- elevation at each end
- rate of grade
- carrier pipe diameter
- casing pipe diameter
- depth of cover for the casing/carrier pipe
- actual length of installation
- bore hole diameter
- actual viscosity, density and composition of drilling fluid
- actual fluid pumping capacity
- pressure and flow rates
- carrier pipe field pressure test results

8.4.8 SCDOT may, at its discretion, change this specification without notice to the utility companies in order to protect the Department's roadway and related facilities.

Chapter 9 - Encroachment Permits or Use of Rights-of-Way Letters

9.1. General

The Department must issue a permit or use of rights-of-way letter before any utility is installed or any other work is performed on State rights-of-way. This applies to both aerial and underground installations. Application Forms 637 or 638 may be obtained from the local Resident Maintenance Engineers or District Engineering Administrator's offices.

9.2. Application

9.2.1 Form 637 applies to public utility companies only. When applying for permission to use the Department's rights-of-way for the construction and maintenance of these public service utility lines along or across a State highway, the applicant must submit Form 637 and five (5) copies of accompanying sketches. Unless extremely impractical, all sketches should be letter size in order to conserve space when filing.

9.2.2 Form 638 applies to all other types of encroachments and in these cases, applicants need to submit the application Form 638 and five (5) copies of appropriate letter size sketches.

9.2.3 The application should contain a concise description of the work to be performed along with a sketch showing a north arrow, the pavement width, the rights-of-way lines and the location of the work to be performed as referenced to both the edge of the pavement, the rights-of-way line and a nearby intersecting road.

9.3. Processing

9.3.1 All applications shall be submitted to the local Resident Maintenance Engineer who will in return issue those so authorized by the District Engineering Administrator. Those beyond his

purview will be forwarded to the District Engineering Administrator for review and issuance. Permits that cannot be issued by the District Engineering Administrator shall be forwarded to the State Highway Engineer.

9.3.2 Once both applicant and the State Highway Engineer or his designee signs the application, it is the approved permit. The original of the executed permit is to be retained by the applicant, one (1) copy is to be retained by the District office, one (1) copy by the Resident Maintenance Engineer, and one (1) copy is maintained in the Utilities/Surveys Office in Columbia, South Carolina.

9.3.3 Where roadway construction is proposed or in progress and where a utility agreement (Form 3068-A) for relocation of utilities is required, applications for encroachment permits will not be required in the area covered by the agreement. Where new utilities are to be placed on the rights-of-way of a road under construction, a permit is needed and the contractor must concur with placement of the utility if the utility company wants to place the utility prior to final acceptance of the roadway by the Department.

9.4. Activities not Requiring Encroachment Permits

9.4.1 Overhead Installation

A permit will not be required for aerial service connections from an existing distribution line on Department Rights-of-way unless it is anticipated that there will be an interference with the normal flow of vehicular traffic on or along the highway or a new pole is to be placed on the Department’s rights-of-way.

9.4.2 Maintenance

A permit will not be required for normal maintenance such as replacing existing poles, cables, pedestals, marker, etc. unless such repairs will entail alterations of normal traffic flow, or the maintenance activities require the relocation of the existing utility.

9.5. Accommodations

9.5.1 The accommodation of utilities by permit or service connections as outlined above, shall conform to the provisions as set forth in this Policy for the Accommodation of Utilities on SCDOT Rights-of-way.

9.6. Liability and Controls

9.6.1 The permittee shall agree, and bind his heirs, successors and assigns, to assume any and all liability the Department might otherwise have in connection with accidents, injuries to persons, or damage to property (including the highway) that may be caused by the construction, maintenance, use of, as well as moving or removing of the encroachment contemplated. The permittee shall further agree to indemnify this Department for any liability incurred, injury or damage sustained by reason of the past, present, or future existence of said encroachment.

9.6.2 The Department, its Engineers, officers or employees shall not be held responsible or liable for injury or damage that may occur to facilities covered by the permit or to any connection or connection thereto by reason of highway maintenance and construction activities or highway contractor or permittee operations.

9.6.3 During the initial installation and construction or during any miscellaneous operations, the Applicant shall at all times maintain such flaggers, signs, lights, barricades and other safety devices as the Engineer may reasonable deem necessary to properly guide and protect traffic upon the highway, and to warn and safeguard

the public against injury or damage. As a minimum, the permittee must comply with the MUTCD. The permittee shall provide a watchman, as required, to maintain said signs, lights, barricades and other safety devices during non-working hours, and shall provide the Department the telephone number and/or address of such watchman so that he may be contacted if needed or in the event of an emergency.

9.6.4 The permittee shall conduct his operations so there will be a minimum of interference with, or interruption of traffic upon and along the highway. This applies to both the initial construction and continuing maintenance and operation of facilities. Except in emergencies, there shall not be a lane closure until a satisfactory plan for handling traffic has been approved by the Department. The Department reserves the right to prohibit any work that may interfere with traffic movement during time of peak traffic flow. The Department reserves the right to inspect the work of the permittee to insure compliance with the permit. The permittee will be required to properly repair the roadway and maintain the repaired or disturbed area for two years. If the Department finds before two (2) years have passed that repairs have deteriorated, the Department will give notice to the permittee for him to make necessary repairs within a period of time specified by the District Engineering Administrator. Should the repairs not be made, the Department will make or have made the necessary repairs to protect the roadway. If the Department is required to incur expense to insure compliance with the permit due to inadequate control procedures by the permittee or necessary repairs, they will be borne by the permittee.

9.6.5 When requested in writing by the Engineer, the applicant or his contractor shall furnish, for the period of time required for the complete installation of the facilities authorized by the permit,

including the repair and restoration of the highway facilities, and also during such future periods of time when operations are performed involving the repair, relocation or removal of said facilities authorized by the permit, a surety bond in the amount specified in the special provisions of the permit. The requirement for the bond and the amount of the bond shall be recommended by the District Engineering Administrator and approved by the State Highway Engineer. The bond shall be written by a Surety Company duly qualified and licensed to do business in the State of South Carolina. No work shall be commenced under the permit until the said bond has been submitted and approved by the Department. Form No. 739 contained in the Appendix or other form satisfactory to the Engineer may be utilized.

9.6.6 Where numerous permits are anticipated by one applicant, the Engineer may allow a permittee to furnish a bond on a periodic basis to cover all permits issued to the permittee during the period specified in the bond. The periodic bond shall be in an amount recommended by the District Engineering Administrator and approved by the State Highway Engineer.

Chapter 10 - **Statutes**

STATUTES AND REGULATIONS RELATING TO ACCOMMODATION OF UTLITIES ON HIGHWAY RIGHTS OF WAY AND ENCROACHMENTS ON HIGHWAY RIGHTS OF WAY

Statutes, South Carolina Code of Laws (1976), as amended:

48-18-70(4). SCDOT must promulgate regulations for erosion and sediment reduction and storm water management on land and land disturbing activities under the jurisdiction of the Department.

57-5-810. Extent of construction and maintenance of State highways in municipalities; city utilities.

57-5-840. Alterations by municipality of State highway facilities and any use made by the city of the highway or highway rights of way for city utilities shall be subject to approval of the Department.

57-5-1080. Permit required to open private driveway or side-road entrance or exit to primary highway.

57-5-1090. Issuance or denial of permits; conditions; providing access or frontage roads.

57-5-1640. Contracts with railroad companies and property owners or lessees for constructing crossings and moving, clearing, rearranging or relocating public utilities.

57-7-50. Cutting trenches or laying pipes or tracks in State highways or bridges; permit required.

57-7-60. Excavating in highways not in State highway system; permit from county supervisor required.

57-7-70. Permit not required for municipality owning waterworks or sewage outside limits.

57-7-210. Unlawful to obstruct highways (to include rights of way).

58-7-10. Rights, powers and privileges of telegraph and telephone companies conferred on pipeline companies.

58-7-20. Rights, powers and privileges of telegraph and telephone companies conferred on water companies.

58-9-2020. Authorization to construct, maintain and operate telegraph or telephone company lines under, over, along and upon any of the highways or public roads of the State.

58-12-10. Installation of television cable over or beneath public lands, highways, roads or waters.

58-27-130. All the rights, powers and privileges conferred upon telegraph and telephone companies under 58-9-2020 are granted unto electric lighting and power companies.

58-29-60(8). Rural electrification authority shall have power to construct or place any part of a system across, in or along any street or public highway without obtaining any franchise or other permit therefore.

58-29-100. Restoration of road along which system is constructed by rural electrification authority; effect on liability of the Department.

Regulations, Code of Laws of South Carolina (1976),as amended:

R.63-380. Standard plan for erosion, sediment and storm water runoff control.

Federal Codes

U.S. Department of Transportation, Federal Highway Administration. *Code of Federal Regulations*. Title 23, Part 645-Utilities. FHWA. Washington, D.C.

Chapter 11 - **APPENDICES**

Application for Encroachment Permit

S.C. Department of Transportation
Form 637 (Rev 11/2003)

Permit Nbr: _____

Applicant: _____	County:
Street: _____	Enter **Road/Route** And then the corresponding **Road Name** below:
City: _____	1. _____ 1. _____
State & Zip: _____	2. _____ 2. _____
Phone: _____	3. _____ 3. _____
	4. _____ 4. _____
	5. _____ 5. _____

1. The undersigned applicant hereby applies to the South Carolina Department of Transportation (SCDOT) for a permit for encroachment on State Highway Right of Way as shown and described below:

2. Type of Encroachment:

_____

_____

3. Description of Location:

_____

_____

_____

_____

_____

_____

(Attach sketch indicating roadway features such as: pavement width, shoulder width, sidewalk and curb and gutter location, significant drainage structure, north arrow, right of way width, and loction of the proposed encroachment with respect to the roadway centerline and the nearest intersecting road on the State system.)

4. The undersigned applicant hereby requests the SCDOT to permit encroachment on the SCDOT right of way as described herein. It is expressly understood that the encroachment, if and when constructed, shall be installed in accordance with the sketch attached hereto and made a part hereof.

The applicant agrees to comply with and be bound by the SCDOT's "A Policy for Accommodating Utilities on Highways Rights of way", "Standard Specifications for Highway Construction", the "General Provisions" and "Special Provisions", attached hereto or made a part hereof by reference, during the installation, operation and maintenance of said encroachment within the SCDOT's Right of Way.

The applicant hereby further agrees, and binds his/her/its heirs, personal representatives, successors, assigns, to assume any and all liability for accidents or injuries to persons, or damage to property, including the highway, that may be caused by the construction, maintenance, use, moving or removing of the physical appurtenances contemplated herein, and the applicant agrees to indemnify and hold SCDOT harmless from and against any and all claims for personal injury and/or property damage which may be sustained by any person by reason of the construction, maintenance or existence of said encroachment on the SCDOT's right of way.

Applicant's Name: _____ Date: _____
(Please print or type)

Applicant's Sig: _____ Title: _____

In accordance with your request and subject to all the provisions, terms, conditions and restrictions stated in the application and the general and special provisions attached hereto, the SCDOT hereby approves your application for an encroachment permit. This permit shall become null and void unless the work contemplated herein shall have been

completed prior to: _____

(Date received by Res. Maint. Engr.)	(SCDOT Approval)	(Date)
	☐ Resident Maintenance Engineer	☐ State Highway Engineer
	☐ District Engineering Administrator	☐ District Maint./Constr. Engineer

APPLICATION FOR ENCROACHMENT PERMIT

No._____

(ENCROACHMENT PERMIT OTHER THAN A PUBLIC UTILITY)

APPLICANT: AND ADDRESS: TELEPHONE NUMBER:	COUNTY: ROAD/ROUTE: ROAD NAME:

1. The undersigned applicant hereby applies to the South Carolina Department of Transportation (SCDOT) for a permit for encroachment on State Highway Right of Way as shown and described below:
2. Type of Encroachment:
3. Description of location:

(Attach sketch indicating roadway features such as: pavement width, shoulder width, sidewalk and curb and gutter location, significant drainage structure, north arrow, right of way width, and location of the proposed encroachment with respect to the roadway centerline and the nearest intersecting road on the State system.)

4. The undersigned applicant hereby requests the SCDOT to permit encroachment on the Department right of way as described herein. It is expressly understood that the encroachment, if and when constructed, shall be installed in accordance with the sketch attached hereto and made a part hereof. The applicant agrees to comply with and be bound by the Department's "A Policy for Accommodating Utilities on Highways Rights of Way" and "Standard Specifications for Highway Construction" (made a part hereof by reference) on file in the Utility Office of the Department, and all general provisions on the reverse hereof and special provisions below or attached hereto during the installation, operation and maintenance of said encroachment within the Department Right of Way. The applicant hereby further agrees, and binds his heirs, successors, assigns, to assume any and all liability this Department might otherwise have in connection with accidents or injuries to persons, or damage to property, including the highway, that may be caused by the construction, maintenance, use, moving or removing, of the physical appurtenances contemplated herein and agrees to indemnify this Department for any liability incurred or injury or damage sustained by reason of the past, present, or future existence of said appurtenances.

APPLICANT NAME: _____ DATE: _____
(PLEASE PRINT OR TYPE)

APPLICANT SIGNATURE: _____ TITLE: _____

In compliance with your request and subject to all the provisions, terms, conditions and restrictions stated in the application, general provisions on the reverse hereof, and special provisions below or attached hereto, the Department approves the request. This permit shall become null and void unless the work contemplated herein shall have been completed prior to _____.

SPECIAL PROVISIONS:

DATE RECEIVED BY RES. MAINT. ENGR.	DATE FORWARDED	SCDOT APPROVAL	DATE
DATE RECEIVED BY DIST. ENGR. ADMIN.	DATE FORWARDED	☐ RESIDENT MAINTENANCE ENGINEER ☐ DISTRICT ENGINEERING ADMINISTRATOR	☐ STATE HIGHWAY ENGINEER ☐ DISTRICT MAINT./CONSTRUCTION ENGINEER

SCDOT Form No. 739 (2/87)

Bond No. _____
(For Bonding Co. use only)

South Carolina
Department of Transportation

Performance Bond

Know all men by these presents:

That we, _____ (hereinafter called the Principal),
(Name of Permit Applicant or Agent for Applicant)

as Principal and the _____, a _____
(Name of Surety Company) (State Where Surety Was Incorporated)

corporation having its principal office and place of business at _____
(Home Office Address)

and local address at _____, and duly authorized to do
(Street City State)

business in the State of South Carolina (hereinafter called the Surety), as Surety, are held firmly bound unto the South Carolina Department of Transportation (SCDOT), as Obligee, (hereinafter called the Owner) in the sum of

_____ (Dollars) ($_____)
(Amount to be Furnished by SCDOT)

for the payment whereof, Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

Whereas, the Permit Applicant has submitted application to Owner for certain written permit form, which form is hereby referred to and made a part hereof as f ully and to the s ame extent as if copied at length herein. Said application form is dated _____ approximately. The purpose of this Bond is to guarantee that the Principal (as listed above) will
(Month Year)

comply with all stipulations, requirements and specifications of said permit number(s): _____,

which permit SCDOT is to approve and issue to _____ upon receipt of this Bond.
(Name of Permit Applicant Only)

The above permit is to authorize certain construction work as described therein within the right - of - way of _____, County at _____.
(State Highway, Road Name, Project, etc.) (Approx. Location)

Now, therefore, the condition of the foregoing obligation is such, that if the Principal shall well and truly perform and fulfill all the undertakings, convenants, terms, conditions and agreements of said permit and shall also well and truly perform and fulfill all the undertakings, convenants, terms, conditions and agreements of any and all duly authorized modifications of said permit that may hereafter be made, then this obligation shall be void; otherwise, it shall remain in full force. Principal must obtain a written release from Owner before this Bond may be voided or terminated or allowed to lapse.

If the Principal and/or Permit Applicant, if different, does any work on highway right-of-way prior to approval and issuance of the above described permit, this Bond is hereby extended to cover any removal or corrective action determined necessary by the Owner. If the permit is never issued and the Principal and/or Permit Applicant, if different, encroaches onto State right-of-way the Principal and Sutety are also obliged to take whatever action is deemed necessary by the Owner to correct such unauthorized encroachment.

The Surety's aggregate liability hereunder shall in no event exceed the amount set forth above.

No claim, suit or action shall be brought hereunder after the expiration of two (2) years following the date upon which the Principal is released from this Bond. If this limitation is made void by any law, controlling the construction hereof, such limitation shall be deemed to be amended to equal the minimum period of limitation permitted by such law.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of Owner.

Signed, sealed and dated this _____ day of _____, 20 _____.

Name and Adddress of Principal:

_____

_____

_____

Witness:

_____ By: _____

_____ Name of Surety:
(Attorney-in-Fact for Surety)

_____

By: _____ Phone Number: _____
(Attorney's Signature)